System of semantic classes for test's generation

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Abstract — **In this paper the approaches to test's generation is conducted, the method of test's generation in system of semantic classes is offered.**

Keywords - **educational process, system of semantic classes, method of generating tests.**

I. INTRODUCTION

In modern educational technologies the special accent is done on individualization of process of studies, increase of independent work of student, and development of the controlled from distance forms of studies. In this connection enormous value the process of creation and delivery of individual tasks takes [1].

II. METHODS OF TESTS GENERATION

Among the known methods of generation of test tasks it is necessary to mark is a method on the basis of parameterized tests, method on the basis of semantic networks, generation of test tasks with the use of concept-thesis model [2].

III. METHOD OF TEST TASKS GENERATION ON THE BASIS SYSTEM OF SEMANTIC CLASSES

For an increase qualities of test tasks, which are automatically generated in the computerized system, – the method of generation of test tasks is offered on the basis of the system of semantic classes.

St_i - the part of the educational material, which present as follows:

$$St_i = \{[NbS_i, Nm_i, CNJ_i, C_i, \Pr n_i]\}, \quad (1)$$

$$\begin{cases} (\Pr n_i = 0) \Rightarrow (C_i \in BC_0) \cap (NbS_i \in NBC_0) \cap \\ \cap\, CNJ_i \neq NULL \\ (\Pr n_i \in NbS_j) \Rightarrow (C_i \in BC_{j+1}) \cap \\ \cap\, (NbS_i^{St} \in NBC_{j+1}) \end{cases}, \quad (2)$$

where $\Pr n_i$ is a number components of assertion, C_i is a number of base components.

On the basis of base of assertions we can form the set of test tasks:

$$Test_i^{k,m_a,t_a} = \{[NbT_i, CNJ_i, CT_i, NbS_i]\}, \quad (3)$$

where NbT_i is a number of test addition in the base of additions, CNJ_i is a number of test components, CT - component of test, NbS_i is a number components in the base of assertions, k is a maximal amount component of test task, m_a is a maximal amount of alternatives, t_a is an amount of correct alternatives.

Test tasks are formed going out from the followings correlations:

$$(NbS_i \in BC_0) \Rightarrow (KN_i^1 = NbS_i) \cup \cup (lm_i^1 = N_m) \cup (CT_i = [TS_r + C_{NbS_i}]), \quad (4)$$

$$TS_r \in STS, \quad (5)$$

where TS is test addition, lm is a level of multiplicity, KN_i is a key number of i-th test, STS is a plural of test additions, r is a casual index of STS element.

Form plurals component of faithful alternatives for test tasks:

$$(\Pr n_{NbS_i} = KN_i^{l-1}) \Rightarrow (KN_i^l = NbS_i) \cup \cup (CT_i = C_{NbS_i}) \cup (CT_i \in STA^l) \cup (lm_i^l = Nm_{NbS_i}), \quad (6)$$

where STA^l is a plural of faithful alternatives on l-th component.

IV. EXPERIMENTS

On the basis of the method described higher the row of experiments which confirmed his correctness was conducted.

In Table 1 it is presented the test of tasks, generated automatically with the different level of complication:

Analysing the generation of test tasks the offered method it is necessary to mark semantic and lexical accordance which eliminates appearance of incorrect alternatives.

TABLE 1

GENERATION TESTS OF LOW COMPLEXITY

Test / Altern.	SQL -
1	structured query language, which used for user interaction with databases;
2	structured query language, which describes the final data;

V. CONCLUSIONS

The method of generation of test tasks is offered on the basis of the system of semantic classes which the task of the set complication allows to generate recognition semantic and lexical correctness.

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